The Pricing of Mortgages by Brokers: An Agency Problem?

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Abstract

Mortgage brokers have grown in importance in the home mortgage origination process in recent years, suggesting they provide a valuable service matching borrowers and lenders, although their involvement has also been linked to the recent surge in mortgage defaults and foreclosures. As in other markets dominated by brokers, agents' incentives are often poorly aligned with those with whom they do business, in this case both the lenders who bear the risks once the loan is originated and the consumer who assumes liability for the debt and contract terms. This paper describes the institutional arrangements under which mortgage brokers operate and empirically test whether loans originated by mortgage brokers are lower in cost than those that would be available directly from retail lenders. The results suggest that loans originated by brokers cost borrowers about 20 basis points more, on average, than retail loans and that this premium is higher for lower income and lower credit score borrowers.

According to a previous posting on the National Association of Mortgage Brokers (NAMB) website,[1] mortgage brokers:

> ''are real estate financing professionals acting as the intermediary between consumers and lenders during mortgage transactions. A mortgage broker works with consumers to help them through the complex mortgage origination process. A typical broker has a working relationship with numerous banks and other lenders and provides the consumer with access to hundreds of options when it comes to financing a home. This allows mortgage brokers to provide consumers the most efficient and cost-effective method of obtaining a mortgage that fits the consumer's financial goals and circumstances. Mortgage brokers have helped many consumers, including low-to-moderate income borrowers with less than perfect credit histories, enjoy the benefits of homeownership.''

The importance of brokers in the mortgage industry has grown significantly in recent years, especially since the availability of automated underwriting circa

1995. Again, according to NAMB, 53,000 mortgage brokerage firms employ approximately 419,000 loan officers, who produced approximately 65% of the residential mortgage loans originated during calendar year 2004. This is an increase from 52% of all loans in calendar year 1997 (LaCour-Little and Chun, 1999). Percentages for 2005–2006 may be still higher, though the recent mortgage market turmoil caused the percentage to drop to 57% for the full year 2007 and to 49% during the first quarter of 2008 (*Inside Mortgage Finance*, 2008). Moreover, real estate brokers, who often have mortgage broker affiliates or referral relationships, account for about 86% of all home sales in the United States during 2003 (National Association of Realtors, 2004). Comparing these percentages to the labor market, Posey and Yavas (2004) report that 35% of hiring occurs through employment agencies. Clearly, real estate and mortgage lending are areas in which brokers play a dominant role.

Using the Home Mortgage Disclosure Act (HMDA) data, it is possible to make some estimates of the revenue derived from the mortgage brokerage business. During calendar year 2006 (the peak of the housing market), approximately 14,000,000 residential mortgage loans were originated (Federal Reserve, 2007).[2] This number includes both conventional and government-insured loans, for either purchase or refinancing, first and junior liens, and loans secured by manufactured housing, as well as HMDA-reportable multi-family loans.[3] Moreover, since HMDA does not cover all loans or all originators, this is a conservative estimate of the size of the mortgage market. Assuming that brokers were involved with 60% of all originations, an average loan amount of $170,000 and that mortgage brokers earn on average 2% on a transaction, these figures imply total industry revenue of almost $29 billion in 2006.[4] Such large figures have attracted attention in the business press (see, for example, *Wall Street Journal*, 2007). The trade press also frequently carries accounts of problematic behavior by mortgage brokers, including fraud (see, for example, Berquist, 2005). Given the surge in foreclosures and downturn in housing prices, employment in real-estate finance, including mortgage brokers, has declined to 365,000 from a peak of 505,000 in October 2006 (*Wall Street Journal*, 2008).

Mortgage brokers are also lightly and inconsistently regulated. Backley, Niblack, Pahl, Risbey, and Vockrodt (2006) discuss the topic of mortgage broker regulation, noting that 28 states license the firm only, as opposed to individuals. They also provide a limited comparison between Wisconsin and Minnesota, after adoption of mortgage broker regulation by Wisconsin (in 1988) and Minnesota (in 1999). Bankrate Monitor (2004) provides an online summary of state laws governing mortgage brokers. According to this summary, Alabama, Alaska, Colorado, Montana, and Wyoming have no regulation of mortgage brokers at all. Other states impose various educational requirements, testing requirements, and/or financial requirements on either individual brokers and/or the firm employing them. Kleiner and Todd (2007) analyze mortgage brokers as an emerging regulated occupation, finding that certain aspects of mortgage broker regulation may affect market outcomes. They find, for example, that net worth and financial bonding

requirements for mortgage brokers are associated with modestly reduced broker employment and subprime loan originations.

Mortgage brokers earn compensation for their services in several ways. First, they may charge consumers points and fees for their services. Points are a function of loan amount, while fees are invariant and may represent costs incurred by the broker and then passed through to the consumer, possibly with some mark up along the way (e.g., the cost to obtain a credit report on a prospective borrower) or direct charges for the mortgage broker's services, such as an underwriting or document preparation. Controversial among broker revenue sources is the yield spread premium (YSP), a payment by the lender to the broker for delivery of an over-par note rate (e.g., a 6.00% loan in a 5.50% market). YSPs have survived court challenges as illegal kick-backs under the Real Estate Settlement and Procedures Act (RESPA) despite much litigation. For a further discussion of the RESPA issues, see Jackson and Burlingame (2007). Mortgage brokers are not legally the agent of either borrower or lender, a situation that further muddies the water in terms of pricing and disclosure requirements.

The fundamental agency issue with mortgage broker compensation is that, within a normal range, the more the principal (borrower) pays, the more the agent (broker) makes.[5] This is similar to other commission-based sales arrangements such as those used by auto dealers, buyer's brokers in the real estate market, and similar transactions. YSPs are often defended as a mechanism to reduce the transaction costs associated with mortgage financing, particularly for liquidity-constrained borrowers. For example, the so-called ''no-cost refinance'' usually simply means that all transaction costs are paid by the broker and recouped through the YSP.[6]

Exhibit 1 provides a numerical example that is based on an actual publicly available wholesale rate sheet.[7] Such rate sheets are often available on the Internet by searching on the term ''wholesale rate sheet.'' Examining Exhibit 1, the par rate on this date for a 30-year fixed-rate conforming conventional loan was 5.375%, meaning that loans bearing that note rate would be saleable by the broker to the lender for 100. Thus, any compensation to be earned by the broker for a loan priced at that rate would have to come from points and fees paid by the borrower in cash to the broker. But, for example, a 6.0% coupon would also be saleable at 102.50, producing a YSP to the mortgage broker of 2.50% of loan amount. The broker could, in the $100,000 loan amount example shown, provide $500 in ''free'' services to the borrower by, for example, covering the costs of appraisal (say, $300), credit report (around $50), and preliminary title report (about $150), and still net $2,000 in compensation on the transaction. In this case, any points or fees also collected from the borrower would further enhance total broker compensation.

Do these arrangements allow borrows to obtain the lowest possible rate from the set of lenders active in their local market? Or are brokers simply extracting economic rents from consumers due to their informational advantage and the

Exhibit 1 | Example of Wholesale Rate Sheet

Note Rate	Price	Payment	YSP($)	YPS (pts)
5.250	99.125	$552.20	$(875)	−0.875
5.375	100.000	$559.97	$ −	0.000
5.500	100.500	$567.79	$500	0.500
5.750	101.250	$583.57	$1,250	1.250
6.000	102.500	$599.55	$2,500	2.500
6.125	102.750	$607.61	$2,750	2.750
6.250	103.125	$615.72	$3,125	3.125
6.375	103.625	$623.87	$3,625	3.625
6.500	104.000	$632.07	$4,000	4.000

Notes: The Note Rate and Price columns in the table above show the prices at which a particular lender will fund conventional conforming 30-year fixed-rate mortgages with 15-day delivery on January 21, 2004. Using a $100,000 loan amount as an example, the three columns to the right show the borrower's monthly payment, the yield spread premium (YSP) in dollars, and the yield spread premium in points. The YSP would be paid to the broker by the lender at closing.

complexity of the mortgage transaction? Do yield spread premiums help liquidity-constrained borrowers finance home purchases or do they merely provide another way for brokers to obscure the fees they are actually charging consumers? Do brokers earn their income by reducing borrowers' borrowing costs or only reduce their search costs? These and related questions will be addressed in the analysis presented here.

The plan for the balance of this paper is as follows. The next section reviews the broader literature on brokers in the housing and mortgage markets and identifies research questions to be addressed. The third section describes the empirical data used for the analysis. The fourth section describes the regression methodology and the fifth section reports results. A final section concludes with policy implications and suggestions for further research.

Literature Review

The literature on principal-agent problems in economics is large so the review here is necessarily limited. The problem is most often formulated as that of an owner employing a manager whose unobservable effort affects profits. The economic question then is what is the optimal contract between the principal and the agent? For a review of the broad literature, see Hart and Holmstrom (1987) and Mas-Colell, Whinston, and Green (1995). The general question in the mortgage context is whether the broker is seeking to maximize the welfare of

clients (by minimizing their search and/or borrowing costs) or maximizing their own commission income.

Yavas (1992, 1994) focuses more narrowly on brokers and other middlemen, who either make markets, by buying and selling for their own account, or providing matching services to facilitate trades in markets with high search costs. Brokers are matchmakers, inasmuch as they do not buy and sell themselves, but simply bring together the parties to the transaction. Matchmakers arise in inefficient markets with high search costs and the benefit they produce is a reduction in the search costs, and the uncertainty as to whether the search will succeed, for the parties that ultimately trade. Yavas (1992) shows that, under reasonable assumptions, matchmakers reduce the range of prices at which a trade can take place by altering the parties reservation prices and earn profits (commissions) reflecting the value of the services provided. In both papers, there is no clear answer as to whether the presence of middlemen increases social welfare.

Significant empirical work on the principal-agent problem has focused on the home sale market. Rutherford, Springer, and Yavas (2005) examine the conflict between home sellers and their real estate brokers, who may be motivated to see any transaction occur during the period of their listing contract rather than maximizing the price received by their home-selling principal while minimizing the time required to consummate a transaction. Using a data set of over 300,000 real estate transactions from several counties in Texas, Rutherford et al. found that properties that were owned by a real estate agent sold no faster (and no slower) than other properties, but did sell for about 4.5% more. This result, which is robust to a number of model specifications, strongly suggests that real estate brokers do not expend the same amount of effort on their principal's properties, as compared to their own.

Rutherford, Springer, and Yavas (2004) also focus on real estate brokers, in particular, how their level of effort may vary with the type of listing contract (exclusive right to sell versus exclusive agency) and house price level. They find that, for lower-priced houses, broker performance (as measured, for example, by time-on-market and selling price discount) is negatively associated with alternative listing arrangements, such as exclusive agency. One might argue that mortgage broker relationships with customers are effectively exclusive agency arrangements since the mortgage broker will not earn a commission if the borrower secures a loan on their own by going directly to a retail lender. Since lower-priced houses will support smaller loans and are likely owned by lower-income households, worse outcomes for lower-income households in the mortgage market may be consistent with this finding in the home sales market.

Gwin (2004) examines real estate broker decisions about the extent of information provided to prospective buyers via Internet advertising. Providing more information reduces broker costs but also risks disintermediation if the home buyer obtains sufficient information independently. In a theoretical model that includes search costs, Gwin shows that buyers will choose to use a broker if transaction

costs (broker fees) are less than the buyer's total cost of searching for a home independently, a process likely to have diminishing returns to additional search. In an empirical analysis using cross-country comparisons, Gwin finds that real estate brokers provide relatively more information if their prospective buyers have relatively higher search costs. The analogies here to mortgage broker behavior are less direct, though one might argue that borrowers will not search across multiple brokers for the best deal since brokers will choose to provide similar levels of information yielding minimal gains to additional borrower search.

Two published studies focus on the role of mortgage brokers directly. LaCour-Little and Chun (1999) examined the prepayment behavior of residential mortgages originated by mortgage brokers, as compared to loans originated directly through the lender's direct employees. LaCour-Little and Chun hypothesized that since brokers can generate income by refinancing existing customers, they have an incentive to ''churn'' the portfolio of lenders with whom they do business, particularly since it is very difficult for lenders to monitor the reason any particular borrower chooses to refinance. Using data consisting of loan level information on 16,974 fixed-rate mortgage loans originated during calendar year 1992, they found that loans originated by mortgage brokers were significantly more likely to prepay, after controlling for other factors affecting prepayment risk. Moreover, they calculated that loans originated by mortgage brokers appeared to be about three times more sensitive to refinancing incentives, compared to retail loans.

A similar study by Alexander, Grimshaw, McQueen, and Slade (2002) focused on the default risk associated with subprime loans originated by mortgage brokers. Alexander et al. found empirical evidence that loans originated by mortgage brokers were more likely to default, after controlling for other risk factors, using loan level data on 23,200 fixed-rate first lien subprime loans originated between 1996 and 1998. They also found that as the market became aware of this channel-specific risk, coupons on loans originated by third parties increased by about 50 basis points relative to otherwise similar retail loans, implying that the risk was priced as performance information became available. Default risk, of course, is relatively easier to price than prepayment risk, since increasing the coupon on a loan simply makes it more likely to prepay, other factors held constant. There is some evidence that points paid may signal reduced prepayment risk, over and above the reduction in coupon that payment of bona fide discount points would normally produce (Stanton and Wallace, 1998).

Several papers address issues related to the pricing of mortgages by mortgage brokers. Woodward (2003) begins by noting the complexity of the mortgage process and the difficulty of comparison shopping that consumers encounter. She outlines and develops proxy measures for various shopping strategies a consumer might employ, noting the uncertain trade-offs between points, fees, closing costs, and note rate. A data set of 2,700 loans originated during the 1996–2001 period is then used for empirical analysis. Average broker compensation is $2,425 on an average loan size of $130,000 (nearly two points). Woodward regresses mortgage

broker compensation on a set of factors likely to affect transaction costs, the ability of the broker to price discriminate,[8] proxies reflecting consumer confusion, and borrower and neighborhood demographics. Among findings, she notes that broker ''fees are profoundly related to borrower education...'' (page 1), with less well-educated borrowers paying their mortgage brokers significantly more.

El-Anshasy, Elliehausen, and Shimazaki (2005) analyze the pricing of subprime mortgages by brokers and lenders. They identify three potential agency problems: (1) brokers may attempt to originate loans to borrowers who do not qualify, i.e., misrepresent borrower qualifications; (2) brokers may actively solicit borrowers for refinancing after the original loan is made; and (3) brokers may encourage borrowers to select products or lenders that maximize broker income, rather than acting in the borrower's best interest. For convenience, these three issues are referred to here as (1) misrepresentation, (2) churning, and (3) steering. As previously described, the two prior published studies have addressed differential default risk, potentially linked to misrepresentation, and differential prepayment risk, potentially linked to churning, among loans originated by mortgage brokers. The third issue, steering, is a particularly difficult problem to identify, particularly given the wide array of mortgage products available in the market and the differing wholesale prices offered by distinct lenders. El-Anshasy et al. focus on the narrower question of whether subprime loans originated through mortgage brokers are more or less costly to borrowers compared to otherwise similar loans originated directly through lenders. This is the empirical question addressed here, too, though the data are on prime loans and a much smaller sample.

In their empirical analysis, El-Anshasy, Elliehausen, and Shimazaki (2005) used the American Financial Services Association's (AFSA) database, which contains data on almost one million subprime loans originated by 10 large lenders between 1995 and 2003. Focusing on the annual percentage rate (APR) of loans originated, the authors do not find support for the claim that borrowers pay more for loans originated through brokers, compared to loans made directly by lenders. In fact, they report the rather surprising result that ''broker-originated mortgages are less costly to the borrowers than lender-originated mortgages after holding other loan terms and borrower characteristics constant,'' (page 12). In the regression results presented, one specification separately estimates the choice to use a mortgage broker using an array of exogenous demographic census tract characteristics. Even with this additional control for possible sample selection bias, loans priced by mortgage brokers appear to cost 14–22 basis points[9] less than loans originated directly by lenders. One difficulty with this methodology is that if lenders place limits on the risk of the loans they will originate through brokers (due to the misrepresentation risk discussed above), then higher cost loans will necessarily show up as non-broker originated and brokers may only appear to have a pricing advantage over direct-from-lender loans. On the other hand, if brokers actually search out the lowest rate, given risk, for their customers across multiple lenders and those price-risk combinations do vary, then the broker-originated price may reflect greater competition than the lender-originated rate, in which the borrower

may have simply accepted whatever price the lender quoted without comparison shopping.

Jackson and Burlingame (2007) discuss the issues surrounding YSPs from a legal perspective, focusing on recent litigation and reporting results from plaintiff's expert testimony in litigation related to this issue. Jackson and Burlingame review the legislative history of RESPA and argue that payment by lenders of YSPs is problematic for a variety of reasons, including the lack of transparency of the mortgage pricing process and the power of mortgage brokers, who they describe as ''market professionals,'' to direct business to particular lenders. In their empirical analysis [which uses approximately the same data as Woodward (2003)], they report that over 80% of the broker-originated loans analyzed contained YSPs averaging about $1,800 (1.5% of loan amount) and that only the minority contained offsetting financial benefits (payment of other transaction costs) on behalf of borrowers. Moreover, Jackson and Burlingame report that African-American and Hispanic borrowers paid more than other borrowers. In terms of the typical costs for broker-originated loans, articles in the trade press report average broker fees of 2.5% for option ARMs, 1.88% for subprime loans, and 1.48% for standard fixed-rate mortgages (*Wall Street Journal*, 2007).

Most recently, Woodward (2008) presents a study of FHA closing costs, including fees paid to brokers, direct lenders, title insurance providers, and other real estate service providers. She reports an average cost of $4,000 paid to mortgage brokers and $3,150 paid to direct lenders using a nationwide sample of 7,560 FHA-insured loans with an average initial loan amount of $105,000. Those fees include upfront charges and YSPs. She finds that fees and charges vary widely, with evidence that minority borrowers and those in areas with lower levels of education pay more.

Several other papers in the growing literature on loan pricing to consumers include models that control for origination channel. While not specifically focused on the topic of mortgage brokers, these papers provide additional evidence that the origination channel matters for consumer outcomes. LaCour-Little (2007) in a study focusing on low and moderate income borrowers purchasing homes during 2002, reports mixed results for broker originations across product categories. He finds an 8 basis point premium in note rate for FHA loans originated by mortgage products after controlling for a variety of pricing factors, but lower note rates for broker originations in the nonprime, special affordable housing program, and conventional conforming market segments. Courchane (2007), in the most important recent study of mortgage loan pricing differentials by race, reports APR price premiums for wholesale originations for both prime and subprime loans in most cases. For example, using loan level data on almost 367,000 loans originated during 2005, she finds that wholesale originations have APRs 31 basis points higher in subprime and 23 basis points higher in prime, using an exogenous switching framework to model origination in the subprime versus prime segments of the market. Wholesale loans include those originated by correspondent lenders which may, in turn, contain some mix of broker business.

To briefly preview our empirical results here using a much smaller dataset consisting of prime loans, we find the opposite effect from that reported by El-Anshasy, Elliehausen, and Shimazaki (2005) and results similar to those reported by Woodward (2003, 2008) and Jackson and Burlingame (2007). We find that loans originated by brokers are more costly, on average, than loans available directly from mortgage lenders. Moreover, while some borrowers obtain lower prices through brokers, outcomes are unequal in the sense that lower income borrowers appear to pay higher prices. This is consistent with a broader economics literature on marketing practices and outcomes in consumer shopping and bargaining in automobile sales, a similar ''big ticket'' item sold in a negotiated market (Ayres and Seigelman, 1995; and Busse, Scott-Morten, and Zettelmeyer, 2006).

Data

We exploit data from two different loan originators, both of whom prefer anonymity, for the empirical analysis. Both sets of data include detailed information on loans originated during calendar year 2000 in the state of Florida. The first lender (hereafter Lender A) originated loans through both broker and retail channels and we have information on both. The second lender (hereafter Lender B) originated loans through both channels; however, we have information only on the broker-originated loans; however, the data is somewhat more detailed. Given the two data sets, we can construct a test to determine whether broker-originated loans were priced at a lower cost compared to those that would have been available directly from at least one retail lender operating in the same geographic market. This will allow us, in the second stage of our analysis, to analyze those factors associated with higher broker pricing and the level of broker compensation. The data set is relatively small, consisting of 834 loans originated in the state of Florida during the first nine months of calendar year 2000. There are 346 retail loans and 488 broker-originated loans in total.

Exhibit 2 provides descriptive statistics on the two sets of loans. By construction, all loans are fixed rate and of conforming loan size ($252,700 for a single-family unit during calendar year 2000).[10] The average loan size is similar, slightly over $100,000) and borrower income levels are similar in the $60–$80,000 range, although slightly higher for broker-originated loans. The broker-originated loans do have higher loan-to-value ratios with a mean of 83% versus 69% for the retail-originated loans. Importantly, both sets of loans are to borrowers with prime level credit scores, on average. In contrast, El-Anshasy, Elliehausen, and Shimazaki's (2005) work, previously described, was based on subprime loans. Here the average FICO score is 709 for the retail loans and 703 for the broker originations. The average note rate for retail originations (with zero points) is 8.14% versus 8.42% for broker-originated loans, implying an uncontrolled note rate premium for of 29 basis points for loans originated by mortgage brokers. Note that this is a low

Exhibit 2 | Descriptive Statistics

	N	Mean	Std. Dev.
Retail Loans			
Month that loan closed	346	5	2
Loan amount	346	$102,042	$54,754
Note rate	346	8.14	0.37
Loan term	346	310	81
FICO credit score	298	709	56
FICO credit score missing	346	0.14	0.35
Loan-to-value ratio	346	69	18
Borrower income	346	$61,699	$73,642
Indicator- not owner-occupied primary residence	346	0.12	0.32
Broker-Originated Loans			
Month that loan closed	488	5	2
Loan amount	488	$121,371	$57,432
Note rate	488	8.42	0.37
Loan term	488	341	55
FICO credit score	463	703	54
FICO credit score missing	488	0.05	0.22
Loan-to-value ratio	488	83	14
Borrower income	488	$83,928	$78,961
Indicator- not owner-occupied primary residence	488	0.14	0.35

Notes: All loans closed during calendar year 2000. All loans for home purchase purpose. All loans are conforming conventional fixed rate.

estimate, since brokers often charge points and fees in addition, whereas the retail loan data set we have is zero point pricing.[11] We will use a regression approach described in the next section to examine whether the uncontrolled pricing premium persists after controlling for other factors that can be expected to affect loan pricing.

Regression Methodology

Loan pricing will naturally vary by loan product type, date of origination, credit risk characteristics, and other factors. The effect of these factors may be constant across origination channel or they may vary, depending on whether loans are originated directly by lenders or through mortgage brokers. This suggests two distinct regression strategies. If the factors affecting pricing are relatively constant across origination channel, then a fixed effect model simply adding an indicator variable for a broker-originated loan will be sufficient and the coefficient on the broker variable will measure the average increase (or decrease) in loan pricing attributable to the broker channel. If, on the other hand, pricing varies across the

two channels, then we should separately estimate pricing functions for each channel and use the coefficients from the retail model to calculate the implied retail price for each broker-originated loan. We can then examine the distribution of the differences between predicted retail and actual pricing on broker-originated loans. We now discuss the factors affecting loan pricing in some detail, since these will inform our model specification.

The mortgage market, especially the prime mortgage market, is highly integrated with the overall capital markets. As a result, the overall level of interest rates will be the single most important factor in determining mortgage rates over time. We capture the level of mortgage rates with the date on which the loan was originated. Since our combined dataset includes only month and year of origination, this is a somewhat imprecise measure. In addition, the rates actually received by borrowers may be affected by decisions the borrower makes regarding rate locks. Since we do not observe the date of loan application, nor the date on which the loan rate was locked for retail loans, we have an additional source of imprecision in this measure. Accordingly, we present three alternative specifications: (1) simply using dummy variables for the month of loan origination; (2) using the Freddie Mac Primary Mortgage Market rate during the month of loan origination; and (3) using a two-month lagged 10-year Treasury rate. The two-month lag is intend to capture the fact that loans are typically priced through a rate lock mechanism at date of application, rather than the date of loan closing. We will further discuss the issue of rate locks later in the paper and see that in the broker channel borrower failure to lock the rate for a sufficiently long period is likely to be a contributing factor to ultimate loan pricing outcomes.

Loan type is the second factor that can be expected to strongly influence ultimate loan pricing. Loans with shorter amortization periods, 15 versus 30 years, typically command discounts of approximately 25 basis points. We capture this effect with an including indicator variable for a loan term shorter than the 30-year standard contract, which include a few 20 year and 10 year amortization periods. In an earlier version of the paper, we included a small number of adjustable rate loans; however, the mix of these was quite different across the two lenders and pricing varied widely depending on contract type and contract type was not consistent, so to maintain homogeneity of loan type, we have simply dropped these in this analysis.

Another element of loan pricing is eligibility for sale in the secondary market, with jumbo loans typically priced slightly above the conforming loan rate which, in turn, closely tracks the par yield price offered by Freddie Mac and Fannie Mae. To eliminate this source of price variation, we limit our loans to those of conforming loan size during calendar year 2000 ($252,700 for a single-family unit). While not a risk factor per se, loan size is an important factor in the economics of the loan origination process. Given fixed costs of loan origination, larger loans will produce more revenue for the lender and higher commission income for the broker. Hence, we expect smaller loans to carry higher pricing. To narrow the variation in this variable, we recode loan size using a logarithmic transformation (*LOGBAL*).

Risk-based adjustments are also common, even in the prime segment of the mortgage market. Borrower credit score (FICO) and loan-to-value ratio (LTV) are the two most widely recognized risk factors. We include both of these variables in the regressions presented. Moreover, since loans with LTVs in excess of 80% carry additional risk, we specify *LTV* as a categorical variable and expect higher ratios to exhibit higher prices. Likewise, we expect the coefficient on borrower credit score (*FICO*) to be negative, since borrowers with better credit may receive lower pricing.

There are additional variables that would be helpful in developing a more complete specification. In particular, time from application to closing would be helpful. If borrowers benefit from using a broker primarily in reduced search costs, then time to close would be a useful proxy. Recent research on mortgage choice has suggested that borrowers in the subprime segment receive, in addition to more liberal underwriting, an accelerated processing time (LaCour-Little, 2007) as measured by time from application to closing. The data set contains this information for the broker-originated loans but not for the retail loans, so we cannot use it in the first stages of our analysis, though we will come back to this variable later when attempting to identify those factors that lead to differential pricing outcomes and greater compensation to the broker.

Since we cannot observe differential search costs, we limit the analysis to the more direct question of whether borrowers obtaining loans through brokers obtain more favorable pricing compared to what would be available from a direct retail lender. To do this, we first estimate the fixed effects model, pooling loans across origination channel and including an indicator variable for loans originated by brokers. Second, we estimate the same model using retail loans only. Third, we use the coefficients from the retail model to predict, loan-by-loan, the price that would have been available for broker-originated loans had the borrower counterfactually obtained a retail loan from Lender A. Fourth, we examine the difference (premium or discount) that the borrowers could have obtained with a direct retail loan. Finally, we assess the factors that may explain this rate differential and which contribute to overall broker compensation.

Empirical Results

The results are shown in Exhibits 3–7. In Exhibit 3, we report results from a fixed effects model including an indicator variable for a broker-originated loan. In Exhibit 4, the retail model used to predict loan-by-loan retail pricing is shown. In Exhibit 5, the distribution of the difference between the actual rate on a loan originated by brokers and the predicted retail rate is shown. Exhibit 6 presents analysis of the factors that are predictive of the loan-by-loan rate differential illustrated in Exhibit 5. Exhibit 7 examines the effect of this same set of factors on total broker compensation. Four specifications are shown in both Exhibit 6 and Exhibit 7.

Exhibit 3 | Fixed Effects Model with Broker Indicator

	Panel A			Panel B			Panel C		
	Monthly Dummies			Freddie Mac Rate			Lagged 10 Year Treasury		
	Parameter Estimate	Standard Error	*t*-Value	Parameter Estimate	Standard Error	*t*-Value	Parameter Estimate	Standard Error	*t*-Value
Intercept	10.124	0.287	35.3	9.228	0.731	12.62	9.761	0.420	23.2
Not owner occupied primary residence	0.134	0.034	4.0	0.137	0.035	3.95	0.135	0.035	3.9
Loan term less than 30 years	−0.254	0.031	−8.2	−0.256	0.032	−8.01	−0.257	0.032	−8.1
Natural log of loan balance	−0.154	0.021	−7.3	−0.141	0.022	−6.45	−0.143	0.022	−6.5
FICO credit score	−0.0006	0.0002	−2.9	−0.0006	0.0002	−2.74	−0.0006	0.0002	−2.6
FICO credit score missing	−0.443	0.159	−2.8	−0.436	0.164	−2.65	−0.423	0.164	−2.6
LTV over 80%, under 90%	0.111	0.063	1.8	0.085	0.065	1.32	0.085	0.065	1.3
LTV over 90%, under 95%	0.175	0.035	5.0	0.190	0.036	5.29	0.193	0.036	5.4
LTV over 95%	0.212	0.031	6.8	0.218	0.032	6.78	0.219	0.032	6.8
Broker-originated loan	0.204	0.025	8.2	0.197	0.026	7.64	0.195	0.026	7.6

Exhibit 3 | (continued)

Fixed Effects Model with Broker Indicator

	Panel A			Panel B			Panel C		
	Monthly Dummies			Freddie Mac Rate			Lagged 10 Year Treasury		
	Parameter Estimate	Standard Error	*t*-Value	Parameter Estimate	Standard Error	*t*-Value	Parameter Estimate	Standard Error	*t*-Value
Loan closed in February	0.216	0.051	4.2						
Loan close in March	0.287	0.048	6.0						
Loan closed in April	0.168	0.048	3.5						
Loan closed in May	0.231	0.047	4.9						
Loan close in June	0.340	0.046	7.5						
Loan closed in July	0.318	0.048	6.6						
Loan closed in August	0.175	0.049	3.5						
Freddie Mac 30-Year Rate in Month Closed				0.117	0.082	1.4	0.071	0.050	1.4
Two Month Lagged 10-Year Treasury Rate									
Root MSE	0.32			0.33			0.33		
Adj. R^2	0.35			0.30			0.30		

Note: The dependent variable is Note Rate.

Exhibit 4 | Retail Only Model

Variable	Parameter Estimate	Standard Error	*t*-Value
Intercept	9.032	0.455	19.8
Not owner occupied primary residence	0.214	0.057	3.7
Loan term less than 30 years	−0.223	0.043	−5.2
Natural log of loan balance	−0.093	0.033	−2.9
FICO credit score	−0.0001	0.004	−0.3
FICO credit score missing	−0.167	0.266	−0.6
LTV over 80%, under 90%	−0.053	0.097	−0.5
LTV over 90%, under 95%	0.096	0.080	1.2
LTV over 95%	0.068	0.066	1.0
Loan closed in February	0.224	0.086	2.6
Loan close in March	0.397	0.078	5.1
Loan closed in April	0.210	0.079	2.6
Loan closed in May	0.244	0.075	3.2
Loan close in June	0.321	0.076	4.2
Loan closed in July	0.432	0.079	5.5
Loan closed in August	0.208	0.089	2.3
Root MSE	0.33		
Adj. R^2 Adj. R^2	0.19		

Notes: The dependent variable is Note Rate. $N = 348$.

Exhibit 5 | Distribution of Rate Differential

Quantiles		
1	100% Max	0.94
2	90%	0.66
3	75%	0.49
4	50% Median	0.21
5	25%	0.02
6	10%	−0.22
7	0% Min	−1.03

Notes: Distribution of rate differential, defined as the actual note rate for broker-originated loans less the retail rate predicted using the retail-only model shown in Exhibit 4.

Exhibit 6 | Results of a Regression of the Rate Differential from Exhibit 5

	Dependent Variables											
	Panel A			Panel B			Panel C			Panel D		
	Basic Demographics			Adding Race			Adding Risk Measures			Adding Broker Dummy Variables		
Variable	Parameter Estimate	Std Error	*t*-Value	Parameter Estimate	Std Error	*t*-Value	Parameter Estimate	Std Error	*t*-Value	Parameter Estimate	Std Error	*t*-Value
Intercept	0.184	0.091	2.0	0.120	0.090	1.3	0.403	0.246	1.64	0.291	0.353	0.8
Rate lock period 15 days or less	0.219	0.040	5.4	0.135	0.043	3.2	0.085	0.043	2.01	0.046	−0.090	0.9
Rate lock period 15–30 days	0.062	0.042	1.5	0.033	0.041	0.8	0.018	0.040	0.44	0.040	0.710	0.5
Borrower income (in thousands)	−0.001	0.191	−3.5	−0.001	0.188	−3.5	−0.0005	0.186	−2.68	0.0002	−0.710	0.5
Borrower years of education	−0.003	0.005	−0.5	−0.0004	0.005	−0.1	−0.001	0.005	−0.16	0.005	−0.900	0.4
Borrower under age 30	0.089	0.037	2.4	0.076	0.036	2.1	0.024	0.036	0.65	0.036	0.600	0.6
Borrower is Black				0.179	0.079	2.3	0.114	0.077	1.48	0.088	0.910	0.4
Borrower is Hispanic				0.154	0.032	4.9	0.124	0.031	3.98	0.038	0.570	0.6

Exhibit 6 | (continued)

Results of a Regression of the Rate Differential from Exhibit 5

	Dependent Variables											
	Panel A			Panel B			Panel C			Panel D		
	Basic Demographics			Adding Race			Adding Risk Measures			Adding Broker Dummy Variables		
Variable	Parameter Estimate	Std Error	*t*-Value	Parameter Estimate	Std Error	*t*-Value	Parameter Estimate	Std Error	*t*-Value	Parameter Estimate	Std Error	*t*-Value
LTV							0.003	0.001	3.14	0.001	0.001	1.1
FICO							−0.001	0.272	−2.73	−0.001	0.0003	−2.0
FICO missing							−0.285	0.197	−1.45	−0.202	0.195	−1.0
Brokers indicator variables										NR	NR	2.5*
Root MSE	0.31			0.31			0.30			0.27		
Adj. R^2	0.13			0.17			0.22			0.49		

Notes: There are 104 broker dummy variables.
NR:= Not Reported
*F-statistic for all dummy variables.

Exhibit 7 | Effect on Total Broker Compensation

	Dependent Variables											
	Panel A			Panel B			Panel C			Panel D		
	Basic Demographics			Adding Race			Adding Risk Measures			Adding Broker Dummy Variables		
Variable	Parameter Estimate	Std Error	*t*-Value	Parameter Estimate	Std Error	*t*-Value	Parameter Estimate	Std Error	*t*-Value	Parameter Estimate	Std Error	*t*-Value
Intercept	1.380	0.271	5.1	1.245	0.270	4.6	1.617	0.723	2.2	2.352	0.995	2.4
Rate lock period 15 days or less	0.897	0.126	7.1	0.740	0.131	5.6	0.557	0.126	4.4	0.405	0.130	3.1
Rate lock period 15–30 days	0.169	0.125	1.4	0.110	0.124	0.9	0.056	0.118	0.5	0.121	0.112	1.1
Point paid	0.751	0.045	16.6	0.698	0.047	14.9	0.671	0.045	15.1	0.485	0.047	10.2
Borrower income (in thousands)	−0.002	0.001	−3.4	−0.002	0.001	−3.4	−0.001	0.001	−2.3	0.000	0.001	0.1
Borrower years of education	0.010	0.016	0.6	0.015	0.015	1.0	0.015	0.015	1.0	−0.007	0.015	−0.5
Borrower under age 30	0.140	0.111	1.3	0.117	0.110	1.1	−0.083	0.107	−0.8	−0.024	0.100	−0.2
Borrower is Black				0.500	0.240	2.1	0.252	0.229	1.1	0.315	0.247	1.3
Borrower is Hispanic				0.357	0.100	3.6	0.266	0.096	2.8	0.074	0.108	0.7

Exhibit 7 | (continued)

Effect on Total Broker Compensation

	Dependent Variables											
	Panel A			Panel B			Panel C			Panel D		
	Basic Demographics			Adding Race			Adding Risk Measures			Adding Broker Dummy Variables		
Variable	Parameter Estimate	Std Error	*t*-Value	Parameter Estimate	Std Error	*t*-Value	Parameter Estimate	Std Error	*t*-Value	Parameter Estimate	Std Error	*t*-Value
LTV							0.017	0.003	5.4	0.008	0.003	2.6
FICO							−0.002	0.001	−2.9	−0.002	0.001	−2.4
FICO missing							−0.895	0.578	−1.6	−0.608	0.549	−1.1
Brokers indicator variables										NR	NR	13.5*
Root MSE	0.93			0.92			0.87			0.74		
Adj. R^2	0.53			0.54			0.59			0.76		

Notes:
NR:= Not Reported
*F-statistic for all dummy variables.

Beginning with the fixed effects model in Exhibit 3, we obtain very similar results across the three specifications (Panels A, B, and C), regardless of how we control for the overall level of interest rates at the time of loan origination. Moreover, the factors affecting loan pricing are directionally as expected and coefficient magnitudes are very similar across specifications. Loans on non-owner occupied primary residences carry a 13–14 basis point premium in note rate.[12] Loans with terms of less than 30 years have note rates 25–26 basis points lower than the standard long-term contract. Based on the consistently negative sign on the natural log of loan amount, larger loans carry lower note rates, after controlling for credit risk. Specific credit risk differences are reflected in borrower credit score (FICO) and indicator variables for a LTV above 80% and above 90% and 95%. Higher credit scores reduce note rates whereas higher LTVs increase it. Finally, the coefficient on broker-originated loans is consistent at about 20 basis points and statistically significant in all three specifications.

In Exhibit 4, we report the regression model used to generate the prediction of retail loan pricing. The model uses data from Lender A (retail loans) only. The results are generally quite similar to those shown in the fixed effects model shown in Exhibit 3, although standard errors are larger and overall model explanatory power is reduced. For example, the coefficient for credit score is virtually identical and the estimate for the effect of a shorter amortization period is 22 basis points versus 25–26 basis points. As in Exhibit 3, larger loans, loans to borrowers with higher credit scores, and loans with shorter amortization periods carry lower interest rates, other factors held constant.

Next, we use the coefficients from the model reported in Exhibit 4 to predict, loan-by-loan, the retail pricing of all loans originated by brokers and funded by Lender B. The resulting difference in rate is coded so that a positive value represents a higher price by the broker and a negative value a lower price. While we know from the fixed effects model that broker loans appear to be priced, on average, 20 basis points higher than would have been available from a direct retail lender, there may be particular instances when broker match-making produced a lower rate for the borrower. In addition, we wish to understand those factors that are predictive of the rate differential obtained through brokers.

In Exhibit 5, we tabulate the distribution of the difference in note rate between actual broker pricing and predicted retail pricing. This variable is coded so that a positive value means a higher price through a broker; we will sometimes refer to this as the broker premium. The range on the variable is roughly plus or minus 100 basis points. Broker pricing is higher in about 75% of the cases, with a median rate differential of 21 basis points, very similar to the 20 basis points we obtained with the fixed effects model. For about 25% of borrowers, however, the broker appears to have obtained a lower rate than we predict would have been available on a retail basis. This implies that in some instances, brokers were able to obtain a loan that was lower in price than would have been otherwise been available. How this benefit varies with borrower characteristics will be our next topic.

Since we now focus exclusively on the broker-originated loans, we can use additional variables available in the data from Lender B that was not available from Lender A. Notably this includes borrower education (measured in years of educational attainment), race, and age, as well as details on the length of the rate lock period and number of points paid. We re-code several of these variables into categorical format for ease of interpretation. Specifically, we create dummy variables for rate lock periods that are shorter than average (less than or equal to 15 days and 15–30 days, with the hold out period being more than 30 days). We also create a categorical variable for young borrowers, defined as age less than 30. It seems reasonable to assume that younger borrowers are more likely to be first-time home buyers who are less familiar with the mortgage lending process.

In Exhibit 6, we report the results of a regression of the rate differential from Exhibit 5 on these new covariates over four specifications. In the first specification (Panel A), we incorporate the rate lock variables and what one might term the basic demographic factors of income, age, and education, which are intended to proxy for level of financial sophistication and, perhaps, bargaining ability. In the second specification (Panel B), we add borrower race, a variable which may, or may not, be an additional proxy for financial sophistication, but for which specific protections exist, given federal law that prohibits varying the price of credit based on borrower race or ethnicity. In the third specification (Panel C), we add the two primary risk factors, LTV ratio and credit score, since these may be correlated with demographic characteristics. For example, if brokers are able to extract higher premiums from borrowers with low credit scores and credit score is correlated with race, then failure to control for credit score may lead to biased conclusions regarding the effect of race. In the fourth specification, we include dummy variables for the identity of each of the 100 plus mortgage brokers in the data.

In Panel A in Exhibit 6, the coefficient on rate lock period of 15 days or less is positive and statistically significant, as is the coefficients on borrower age under 30. The coefficient on borrower income is negative and statistically significant, suggesting that higher income borrowers pay lower rate differentials. The coefficients on rate lock period from 15 to 30 days and on borrower years of schooling are not statistically significant. In Panel B, the coefficients have the same sign and significance, although smaller magnitudes and the coefficients on the additional race variables (dummy variables for Black or Hispanic borrower) are positive and significant, with magnitudes of 18 and 15 basis points, respectively. In Panel C, when we add credit score and LTV ratio, both are significant (higher credit score borrowers receive lower rate differentials and higher LTV borrowers receive higher rate differentials) and the magnitude and significance of some of the demographic variables changes, suggesting correlation across factors. For example, borrower age is no longer significant, nor is the indicator for Black borrower. Income, however, continues to be negative and statistically significant in this specification. In Panel D, however, when we add indicator variables for individual brokers, none of the demographic variables

retains significance. After controlling for broker identity, i.e., allowing for variation across brokers, the only factor that retains significance is credit score: borrowers with higher scores pay smaller rate premiums.

Next, in Exhibit 7, we consider how these factors affect total broker compensation, defined as the YSP plus points and fees charged directly to the borrower. These origination fees ranged from zero to 500 basis points, with a mean value of 88 basis points. Total broker compensation has a mean value of 2.53 points ($2,818) here, indicating that most of the broker's compensation is derived from YSP. We have in our data the total amount of broker compensation and points charged, but we do not have details on other fees nor the exact amount of the YSP, although broker compensation less points is a good approximation.

In Exhibit 7, we report the results from a regression of total broker compensation on a similar set of factors as that used in Exhibit 6. Since broker compensation includes points, we add this factor to the specification. Again, Panel A includes basic demographics, Panel B adds race to the specification, Panel C adds credit score and LTV ratio, and Panel D adds dummy variables for each of the individual brokers. In general, the pattern of results is quite similar to that shown in Exhibit 6.

In Panel A in Exhibit 7, broker compensation is strongly affected by points paid and this relationship persists across the four specifications. A short rate lock period also positively contributes to broker compensation. Borrower income continues to be negative, implying that brokers earn relatively less from higher income borrowers. This result is consistent across the first three specifications but again disappears when we allow for cross-broker variation. Years of educational attainment and borrower age are not statistically significant in any specification. Borrower race is significant, though less so when we control for credit score and LTV ratio, and is not significant when we allow for cross-broker variation in Panel D. In this final specification, short rate lock period, points paid, LTV ratio, and credit score are the only factors that retain statistical significance.

Robustness Tests

Given our relatively small data set, robustness testing is prudent to ensure the stability of empirical results. Up to this point, we have reported results that are remarkably consistent regardless of how the level of interest rates is specified and regardless of whether we estimate a fixed effects model or allow slope coefficients to vary and estimate pricing differences loan-by-loan. One obvious risk, however, is sample selection bias. If borrowers who choose to use brokers are systematically different from borrowers who obtain loans directly from retail lenders, then those differences may be reflected in the rates they pay independent of the actions of mortgage brokers. After all, these are not experimental data in which borrowers are randomly assigned to receive the broker treatment. In this section, we describe our approach to control for this potential problem.

We follow the well-known Heckman (1979) two-stage approach. In the first stage, the probability of broker use is estimated via probit regression. From the results of the probit equation, the inverse mills ratio is computed. Then, in the second stage we add the inverse mills ratio to the OLS specification reported in Panel A of Exhibit 3. A positive and significant coefficient on the inverse mills ratio is evidence of sample selection bias; however, inclusion of this variable as a covariate controls for that bias and the coefficient on broker will be unbiased.

The results are presented in the Appendix. For the probit equation, for which we omit results in the interest of brevity, we estimate the probability of broker use based on factors that are expected to be exogenous to the behavior of brokers with respect to loan pricing. In particular, we use interest rate level variables (the level of the 10-year Treasury and the mortgage-Treasury spread) and the appraised value of the collateral property. In the second-stage OLS regression, the inverse mills ratio is negative and not statistically significant. More importantly, however, the coefficient estimate for broker is virtually unchanged at 0.20. For convenience, we reproduce results from Panel A of Exhibit 3 so that all of the coefficient estimates may be compared, with and without controls for potential sample selection bias. Differences are minimal. We conclude from this exercise that sample selection bias is not affecting our fundamental result that broker-originated loans cost borrowers more than otherwise similar retail loans.

Another implicit assumption we have made is that all brokers are identical, hence, a single indicator variable for broker-originated. But Guttentag (2007) recommends borrowers deal only with ''Upfront Mortgage Brokers'' (UMBs) who have made the commitment to do business in a fully transparent way. These brokers disclose their fees to customers in advance and in writing and also the wholesale prices they can access from the market. Customers pay a mortgage broker fee disclosed upfront plus wholesale loan prices. While it would desirable to know whether any of the brokers in our sample are members of this organization, our broker identifier is numeric only, so we cannot match broker identities to those shown on the UMB website. We note, moreover, that there are only ten members of this organization in Florida as of 2007 and that the organization did not come into existence until 2005.

As reported previously, we also estimated the models of the determinants of the rate difference and of broker compensation reported incorporating dummy variables for the 104 mortgage brokers in our data, recognizing that most brokers contributed only a very small number of loans to the data.[13] As might be expected, adding such a large number of covariates, increases model explanatory power considerably, raising the adjusted R-squared value from .17 to 0.8 (Exhibit 6) and from .53 to .76 (Exhibit 7).

Examining the coefficients on the individual broker identifiers, the vast majority are not statistically significant. Two that appeared to be in Panel D of Exhibit 6 are broker number 58 (with a large negative sign) and broker number 93 (with a large positive sign). Further examination showed that each of these brokers

contributed only one loan to the data set. This underscores the difficulty in assessing the effect of mortgage brokers in the aggregate. The problem of better monitoring broker behavior would be reduced were they subject to reporting requirements along the lines of the Home Mortgage Disclosure Act, federal law that applies to most lenders.

Finally, it would be appropriate to consider whether patterns of broker pricing vary across geography. Unfortunately, we do not have geographic identifiers for the broker-originated data. We know only that all loans originated in Florida. A larger data set with variation across geography, particularly across states that have different levels of broker regulation, would allow such additional important issues to be explored.

Conclusion

Mortgage brokers have grown in importance in recent years, especially since 1995 when new technology made automated underwriting widely available. Does this market evolution translate to a rate reduction benefit to borrowers, since brokers' superior information allows them to match individual credit applications to the lender with the lowest price for their particular situation? Or are broker fees simply earned by reducing borrower search costs, but not the explicit cost of credit? We have attempted to examine these question in the analysis presented here. Since we do not have a good proxy for borrower search costs, however, we address the narrower question of whether loans originated through brokers command lower interest rates than those that would have been available from a direct retail lender in the same market at the same point in time. Our answer to this question is no, not in general.

Our results indicate that prime loans originated by mortgage brokers are priced about 20 basis points higher than otherwise comparable retail loans, a result that conflicts with El-Anshasy, Elliehausen, and Shimazaki's (2005) finding for the subprime market but which are consistent with Woodward's (2008) results for FHA loans. Moreover, ours is a low estimate of the broker pricing premium since it reflects the difference in note rate only, not including the effect of points or fees, which can be substantial. While the median increase in note rate for loans originated by brokers is 21 basis points, for about 25% of borrowers, the price obtained through the mortgage broker was lower than predicted from a retail lender. This finding suggests that mortgage brokers may reduce credit costs for at least some borrowers. But these savings do seem to vary by borrower type, with higher income borrowers or borrowers with better credit obtaining lower rates from use of a broker and lower income borrowers and/or borrowers with poorer credit not realizing this same advantage. These borrower characteristics are likely to be correlated with other borrower characteristics, such as race or age.

By focusing on the incremental interest costs associated with use of a mortgage broker, we are not implying that the value of brokers' services is limited to explicit

savings in credit costs. Reduction in search costs, increased convenience, and perhaps overall ease of the transaction itself could well motivate some borrowers to prefer obtaining their loans through brokers, notwithstanding the apparent price increment associated with doing so. Moreover, our data set is relatively small and based on a single geography and time period, so the results may not be general. Nevertheless, given the growth in the share of residential mortgages originated by brokers and the inherent conflict of incentives faced by principal and agent, we believe further research along these lines, preferably with larger data sets and multiple lenders, is warranted.

Many of the current regulatory proposals intended to address the problems in the mortgage market that have resulted in the recent surge of defaults and foreclosures contemplate greater regulation of mortgage brokers. For example, legislation pending in the U.S. Senate currently includes the ''Secure and Fair Enforcement for Mortgage Licensing Act of 2008.'' Provisions of the bill are intended to encourage states, through the Conference of State Bank Supervisors and the American Association of Residential Mortgage Regulators, to set up a nationwide mortgage licensing system. The bill also outlines procedures, requirements (including education and testing), and standards for mandatory registration and state licensing of loan originators. Similar legislation introduced by House Financial Services Committee Chairman Barney Frank has been passed by the House of Representatives.

The analysis presented here suggests that further regulation of mortgage brokers may be well be warranted; however, it is not clear that licensing per se would improve outcomes given the economic incentives and agency problems in the originations segment of the mortgage market. Better disclosure of broker compensation may be possible, too, and have some positive effects. But a new model for compensation of mortgage originators is needed, one that better aligns incentives across parties.

Appendix

Robustness Test for Sample Selection Bias: Fixed Effects Model with Broker Indicator

	No Adjustment			Heckman Correction		
Variable	Parameter Estimate	Standard Error	*t*-Value	Parameter Estimate	Standard Error	*t*-Value
Intercept	10.124	0.287	35.3	11.685	1.210	9.7
Not owner occupied primary residence	0.134	0.034	4.0	0.139	0.034	4.4
Loan term less than 30 years	−0.254	0.031	−8.2	−0.254	0.031	6.2

	No Adjustment			Heckman Correction		
Variable	Parameter Estimate	Standard Error	*t*-Value	Parameter Estimate	Standard Error	*t*-Value
Natural log of loan balance	−0.154	0.021	−7.3	−0.157	0.021	3.6
FICO credit score	−0.0006	0.0002	−2.9	−0.001	0.0002	4.9
FICO credit score missing	−0.443	0.159	−2.8	−0.441	0.159	7.5
LTV over 80%, under 90%	0.111	0.063	1.8	0.112	0.063	6.7
LTV over 90%, under 95%	0.175	0.035	5.0	0.180	0.035	3.7
LTV over 95%	0.212	0.031	6.8	0.215	0.031	4.1
Broker-originated loan	0.204	0.025	8.2	0.204	0.025	−8.3
Loan closed in February	0.216	0.051	4.2	0.226	0.052	−7.4
Loan close in March	0.287	0.048	6.0	0.305	0.049	−2.9
Loan closed in April	0.168	0.048	3.5	0.172	0.049	−2.8
Loan closed in May	0.231	0.047	4.9	0.266	0.054	1.8
Loan close in June	0.340	0.046	7.5	0.341	0.046	5.2
Loan closed in July	0.318	0.048	6.6	0.319	0.048	6.9
Loan closed in August	0.175	0.049	3.5	0.185	0.050	8.2
Inverse mills ratio				−1.977	1.490	−1.3
Root MSE	0.32			0.32		
Adj. R^2	0.35			0.36		

Note: The dependent variable is Note Rate.

Endnotes

[1] National Association of Mortgage Brokers: http://www.namb.org/about_namb/mission.htm.

[2] See the Federal Reserve Bulletin, Summer 2007, for an extensive review of the 2006 HMDA data.

[3] Most commercial mortgages on multi-family properties are not reportable under HMDA.

[4] This is almost surely a low estimate. Woodward (2003) reports average mortgage broker compensation of $2,425 per loan using a small sample of 2,700 loans with average loan size of $130,000, originated during 1996–2001, implying average broker compensation of 1.9%; Woodward (2008) reports average broker fees of $4,000 on FHA loans.

[5] Some lenders cap mortgage broker compensation so that, for example, a YSP will be paid for over-par coupons, but only up to a certain level. Since those caps may vary by loan type, they may create incentives to brokers in and of themselves. Likewise, some lenders limit allowable points and fees collected by mortgage brokers.

[6] While technology has surely reduced the cost of mortgage transactions over time, fees for appraisal, title search and title policies, recording fees, and other governmental taxes are real costs that cannot generally be eliminated, though automated valuation systems have made some inroads in reducing appraisal costs.

[7] Exhibit 1 shows a portion of the wholesale rate sheet for National Bank of Commerce for January 21, 2004, with calculations by the author to provide dollar amounts.

[8] In this context, price discrimination refers to the economic concept of charging each buyer the maximum they are willing to pay as opposed to any sort of illegal discrimination based on protected class membership.

[9] In El-Anshasy, Elliehausen, and Shimazaki's (2005) Table 3, the coefficient for broker-originated on first-lien fixed-rate loans is −0.14 and for variable rate loans it is −0.22. The coefficient for hybrid loans is −1.87.

[10] While all loans appear to be conforming conventional at origination, we do not know whether they were ultimately sold in the secondary market or retained in portfolio by the originating lender.

[11] Fees paid for third-party services, such as appraisal and title insurance, do not affect the overall APR of the loan and we assume here that such costs are identical across retail and broker-originated loans.

[12] A small fraction of both the retail and broker-originated loans are for properties that are not the borrower's primary residence, these could be either investment properties or second homes.

[13] We have 488 broker loans and 104 distinct brokers. The largest number of loans from a single broker was 26 and many brokers contributed only one or two loans to the data.

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